

ABSTRACT

A digital IF receiver (DRX) module directly compatible with advanced radar systems such as synthetic aperture radar (SAR) systems. The DRX can combine a 1 G-Sample/sec 8-bit ADC with high-speed digital signal processor, such as high gate-count FPGA technology or ASICs to realize a wideband IF receiver. DSP operations implemented in the DRX can include quadrature demodulation and multi-rate, variable-bandwidth IF filtering. Pulse-to-pulse (Doppler domain) filtering can also be implemented in the form of a presummer (accumulator) and an azimuth prefilter. An out of band noise source can be employed to provide a dither signal to the ADC, and later be removed by digital signal processing. Both the range and Doppler domain filtering operations can be implemented using a unique pane architecture which allows on-the-fly selection of the filter decimation factor, and hence, the filter bandwidth. The DRX module can include a standard VME-64 interface for control, status, and programming. An interface can provide phase history data to the real-time image formation processors. A third front-panel data port (FPDP) interface can send wide bandwidth, raw phase histories to a real-time phase history recorder for ground processing.